

# Evolving the EOSDIS Information Architecture

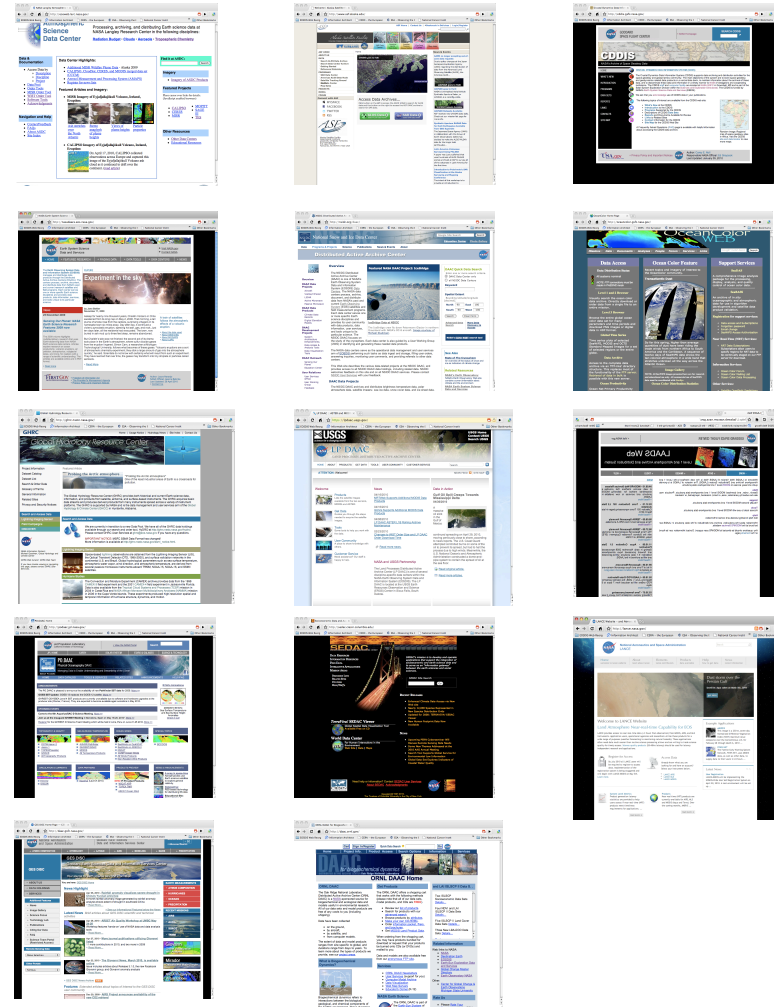
a.k.a. Coherent Web

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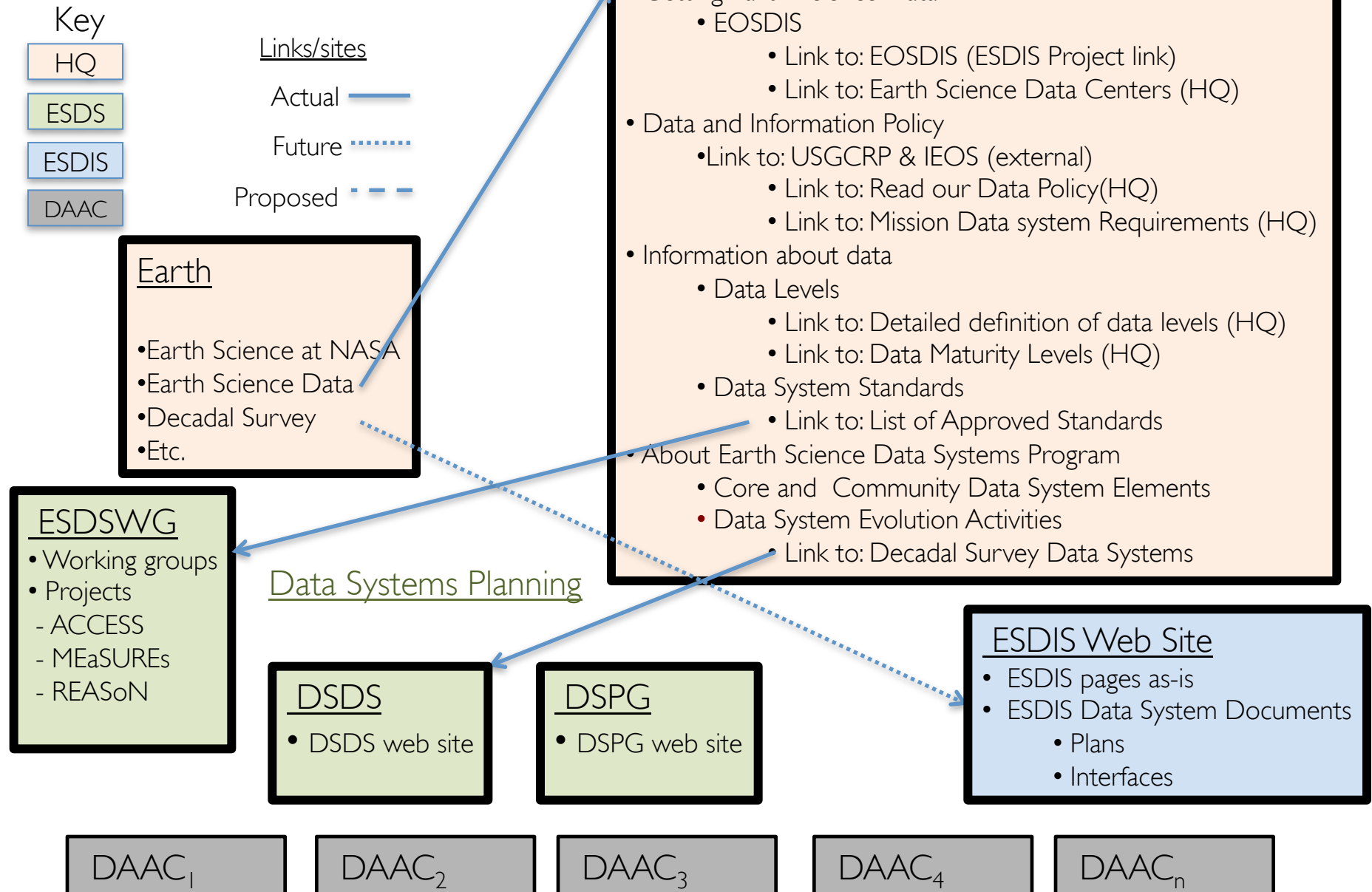
ESIP Federation Meeting, Washington, D.C.

# Context

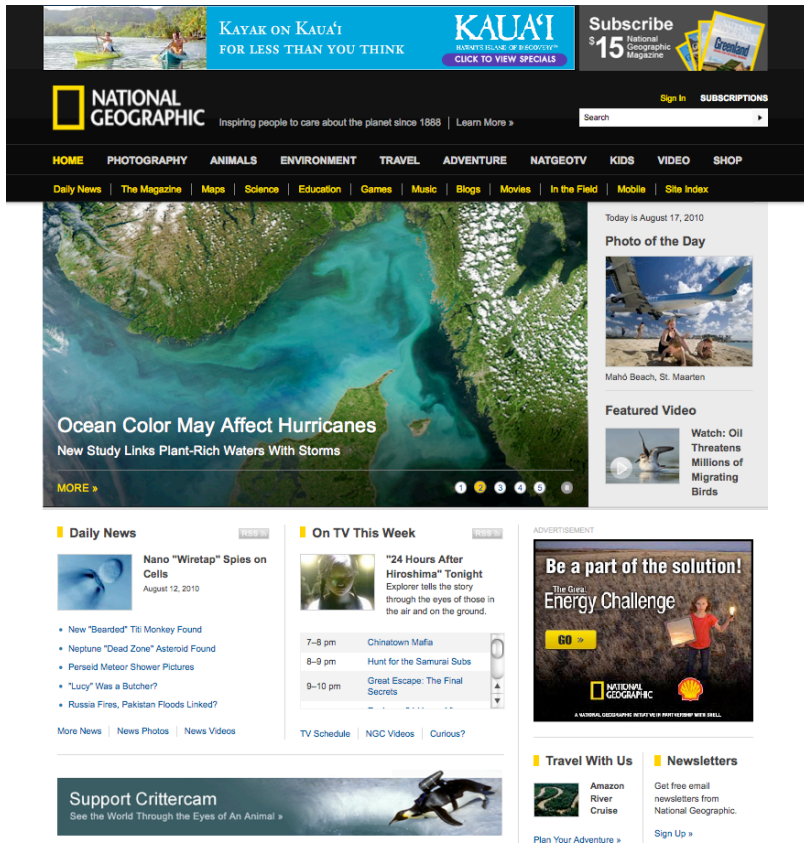
- NASA Earth Science Data Systems are a large and continuing investment in science data management activities
- Websites are the front door to data and services for users (science, programmatic, missions, citizen scientist, etc...) but are discordant
- How do we present these resources and expertise to be a coherent system of systems while remaining flexible to integrate new missions and technologies and remain relevant
- We must preserve what we currently do very well



# Incoherent Web



# Inspiration Examples



## Lesson:

Content management system helped unify the message of National Geographic across 20+ departments/branches



## Lesson:

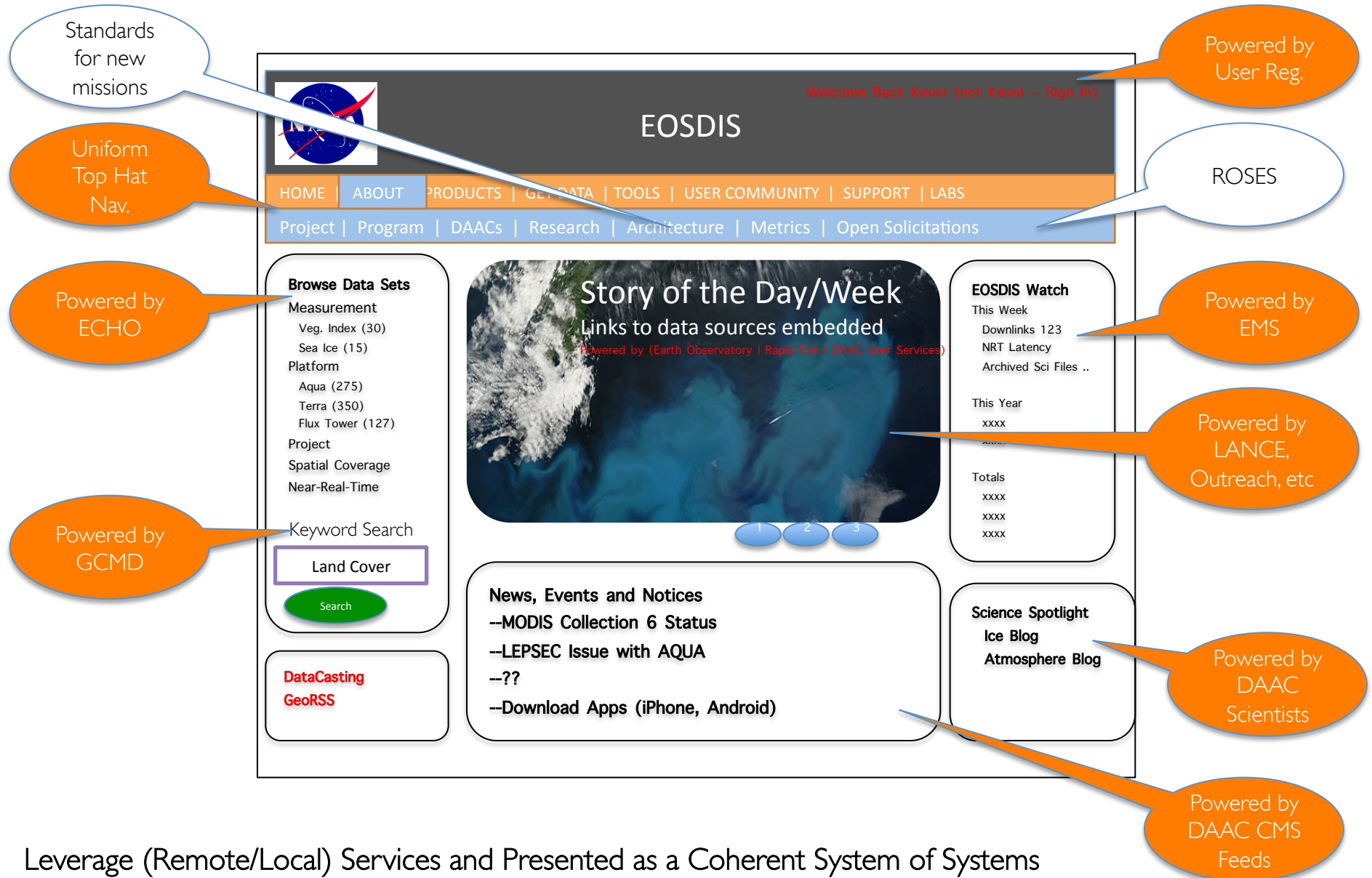
Hosting and maintenance of web applications can be separated from the user interface and the UI can still be immersive and useful for users (aside from the whole social networking)



# Goals

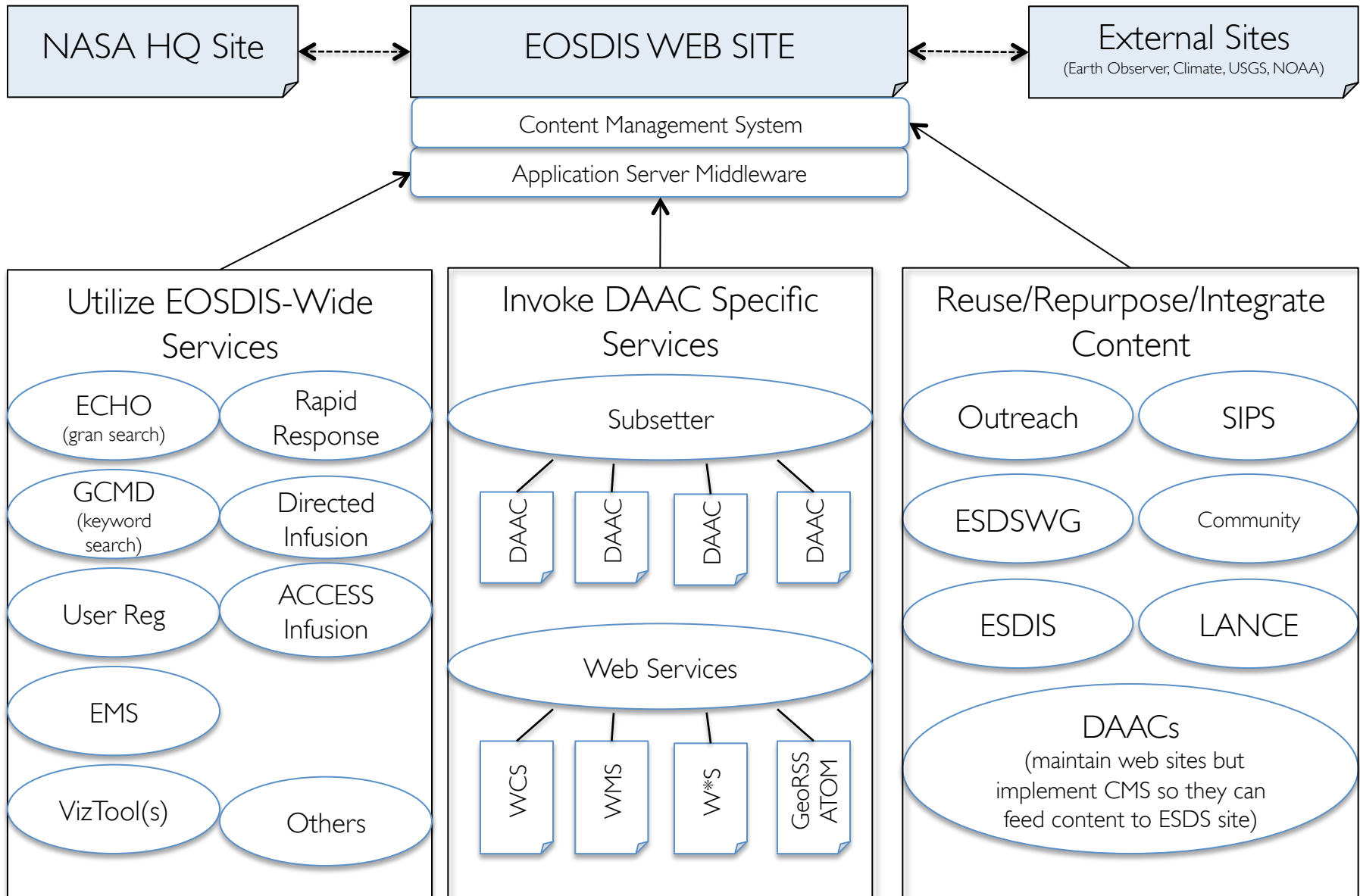
- Present EOSDIS as a coherent yet transparent system of systems by leveraging SOAs provided by DAACs, ECHO, GCMD, EMS, User Reg....To enable new missions, technologies and Earth science partnerships
  - Users navigate the system/resources without needing to know how/who is providing each service.
  - DAAC web sites and services exist, but use the same high-level navigation, nomenclature and other functionalities so users are familiar when they arrive.
- More than just a website or portal
  - An active and immersive user experience leveraging existing and future Web Services (e.g. W\*S, SOAP, RESTful) into a seamless package – search, subset, visualize and deliver data in one session with one username and password while invoking multiple remotely hosted tools
  - Lay the foundation for the Earth Science Collabatory
  - Cloud capable
- Fresh and continually updated and coordinated content

# Grossly simplified mockup



Leverage (Remote/Local) Services and Presented as a Coherent System of Systems

# Architectural Concept



# Science Use Case

# Compare Aerosol Optical Depth from MODIS/Aqua with AIRS Dust Score over NE China

# Find satellite coincidence times for two products

```
$coincidence_url = `find_satellite_coincidences --ref_product=MYD04 --coinc_product=AIRIBRAD --start=2006-01-01 --end=2010-01-01 --bbox=100,30,140,50`;
```

# Extract coincident subsets based on times

```
$coinc_data_url = `esc_get_coinc_subsets $coincidence_url --var=MYD04/Optical_Depth_Land_and_Ocean -var=AIRIBRAD/dust_score`;
```

# Apply quality screening to all data, following science team recommendations

```
$screened_data_url = `esc_quality_screen $coinc_data_url`;
```

# Matchup individual data values

```
$matched_data_url = `esc_matchup $screened_data_url`;
```

# Plot pairs of data (result will be a jpeg)

```
$display_url = `esc_scatterplot $matched_data_url`;
```

# Get pictures from ESC to local machine

```
my ($jpeg_files) = `esc_fetch --dir=/var/tmp $display_url`;
```

# Also fetch data for further processing

```
my ($xy_matchups) = `esc_fetch --dir=/data/matchups/experiment_ncl $matched_data_url`;
```

# Do something with a local program (e.g., extract pairs where AOT is > 0.15 and dust\_score > 360) `filter\_aot\_dust --file=\$xy\_matchups`;

# Surfer Use Case

# Determine the best place to surface today

# Find coincidence between wave height, sea surface temperature and wind direction

```
$coincidence_url = `find_satellite_coincidences --ref_product=SSH --coinc_product=SST --coinc_product=WindVector --start=TODAY --bbox=100,30,140,50`;
```

# Extract coincident subsets based on times

```
$coinc_data_url = `esc_get_coinc_subsets $coincidence_url --var= -var=AIRIBRAD/dust_score`;
```

# Apply quality screening to all data, following science team recommendations

```
$screened_data_url = `esc_quality_screen $coinc_data_url`;
```

# Matchup individual data values

```
$surf_location_url = `esc_matchup $screened_data_url`;
```

# Plot pairs of data (result will be a jpeg)

```
$display_url = `esc_scatterplot $surf_location_url`;
```

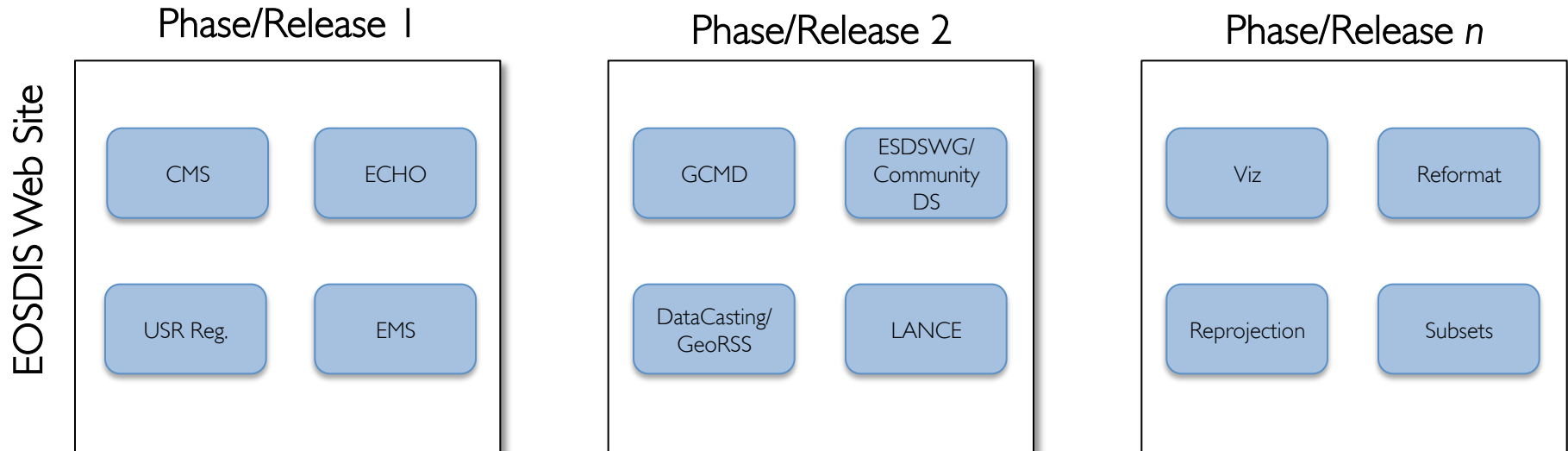
# Get pictures from CW to local machine

```
my ($jpeg_files) = `esc_fetch --dir=/var/tmp $display_url`;
```

# Get Directions from Google Maps

```
my ($directions) = `google_fetch --dir=/data/matchups/experiment_ncl $surf_location_url`;
```

# Phasing – straw-man



Objectives			
	<ul style="list-style-type: none"> <li>• Develop content management system infrastructure/expertise</li> <li>• Converge and implement uniform navigation</li> <li>• Implement some cross-DAAC functionality</li> </ul>	<ul style="list-style-type: none"> <li>• Chain available web services so they behave as a single entity</li> <li>• Limited social networking</li> <li>• Mobile accessibility</li> <li>• Integration of FY10 tech. infusion projects</li> </ul>	<ul style="list-style-type: none"> <li>• Harvest data from DAAC CMSs</li> <li>• Web center of excellence</li> <li>• Transparent user experience</li> </ul>
DAACs	<ul style="list-style-type: none"> <li>• Uniform top hat nav.</li> <li>• Expose web services</li> <li>• Cross DAAC web content search</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated User Reg.</li> <li>• Expose additional web services</li> <li>• Formulate nomenclature</li> <li>• Implement CMSs</li> </ul>	<ul style="list-style-type: none"> <li>• Support visualization tool</li> <li>• Widely available W*S</li> <li>• ISO...</li> </ul>

# Phase I

## Overview:

- This project is expected to occur in multiple phases with the ultimate goal of a highly functioning, integrated web presence that ties together the nine EOSDIS/ESDIS websites and feeds into and pulls out of the twelve data center websites.

## Phase I A Systems Engineering and Analysis

- An analysis of the existing ESDIS/EOSDIS websites and web capabilities at EOSDIS data centers. Analysis shall include:
- Propose a web architecture that can be developed by EOSDIS
- Propose technological solutions for a content management system managed by DAACs/ESDIS
- Present platform(s) options to foster interoperability among EOSDIS assets identified above published via web services.
- Define a limited number of use cases for how proposed platforms interact with disparate web services
- Define a concept of operations for management of the system to ensure roles and responsibilities of each party are known along with tools for tracking change requests and usage/access metrics.
- Provide interim status and hold reviews to chart progress and direction of deliverables.



# Phase I B

## Phase I B ESDIS Website Redesign

- Design, develop and deliver a redesigned ESDIS website (currently <http://esdis.eosdis.nasa.gov/>) that will encompass a redesign and consolidation of ESDIS, ECHO, DAAC Alliance, EMS, Outreach and ESDSWG. User Registration will be applied to the new site but is not considered part of the redesign.
- Provide a web content management system allowing for content posting/ownership by each of the aforementioned groups.
- Implement ESDIS Web metric tracking and include a localized site search that may be replaced by an EOSDIS-wide free text capability (see below).
- A high-level navigation bar (top hat) will also be developed to allow for easy navigation of the major components and resources EOSDIS provides at the top level of navigation.
- Subsequent navigation levels will be customizable allowing the 'top hat' to be implemented by DAACs within their environments and for their discipline areas.
- A free text site search capability (e.g. Google Site Search or similar) will be utilized that will be implemented within the redesigned ESDIS website and can be implemented by DAACs.
- A concept of operations that ties the content management system, enhancements and issues will also be provided.
- Provide interim status updates and hold reviews to chart progress and direction of deliverables

Backup

# Governance and Review Team

- Carey Noll
  - Where: CDDIS
  - Why: NASA Web standards and UI Design
- Alex de Sherbinin
  - Where: SEDAC
  - Why: UI Design, Web Information Architecture and GIS
- Thomas Huang
  - Where: PO.DAAC
  - Why: System architecture and development)
- Rahul Ramachandran
  - Where: Currently at GHRC, moving to ORNL in CS branch – not ORNL DAAC
  - Why: System architecture, community interaction, UI)

# Working Group Defined Objectives

- Increase use of NASA Earth science data and services
- Encourage interdisciplinary researchers to find and use the data they need
  - interoperable data and services
  - reduce barriers to non-expert users – e.g. MISR expert wanting to use LIDAR
- Actively experiment with technology and presentation
  - being in front and not following others
  - realize when something does not work and move to something else
- **Web services – separating the content from the display - platform for displaying current capabilities**
- Enable community engagement
- Increase ACSI survey scores

# Working Group Recommendations

- Develop a coherent web presence for the Earth Science Data System Program from top-to-bottom (HQ-EOSDIS-DAACs)
  - Better represent EOSDIS programmatic investments and capabilities
  - Have data centers more clearly represented as elements of a larger system
  - Facilitate multidisciplinary research and data integration
  - Quickly respond to emerging environmental issues with the wealth of data at our disposal (earthquakes, volcanoes, etc...)
  - Provide a platform for demonstration of interoperability throughout all of our systems
- Don't lose sight of what we do well now
  - Data centers (DAACs) are experts and need to tailor content and services to their users, thus they must maintain websites
  - DAACs are related to other NASA Earth Science Programs and this relationship should be shown